The zinc oxide, sodium acetate, ammonium alum and acryloid resin were first thoroughly mixed together and the water was then added and thoroughly mixed.

EXAMPLE II

Two sheets of 4 ft.×8 ft. gypsum wall board were placed at 90° to each other to simulate a wall corner. A creamy, spreadable joint cement was prepared by mixing about 15 to 35 parts of the liquid additive of Example I with about 65 to 85 parts of the wall board joint compound of Example I. The resulting joint cement was used to bond the two sheets together and to completely fill the joint without a tape material.

After the joint cement was allowed to harden at room temperature (about 20–30 minutes), the simulated corner structure was placed in a heating chamber and heated to about 500° F. for 5 hours. The joint between the panels was visually inspected and there was no evidence of cracking.

After cooling, a 22 pound, perpendicular pushing force was applied simultaneously to each panel in an attempt to force them apart. The corner joint remained in tact; however, one of the panels snapped and the paper portion thereof tore at about 2 inches from the corner joint.

EXAMPLE III

A joint cement prepared in the manner described in Example II was used to close and fill the joint beteen two 2 ft.×2 ft. panels of gypsum wall board without a tape material. After the cement had hardened, the resulting structure was cyclically heated to 90° F. and allowed to cool to room temperature 15 times. The joint was visually inspected and there was no evidence of cracking.

EXAMPLE IV

Simulated wall panels were constructed by nailing a 4 ft.×8 ft. sheet of tapered SW gypsum wall board onto a 4 ft.×8 ft. rectangular frame constructed from wood 2×4's. Two of these simulated wall panels were fastened together along one long edge. A joint cement prepared in the manner described in Example II was troweled into the joint between the adjoining sheets of wall board to completely fill the joint and provide a smooth feathered surface without a tape material.

The resulting structure was placed in a mechanism designed to simulate the type of forces which can be exerted on a modular wall structure for prefabricated buildings during handling and over-the-road transportation from an assembly plant to a construction site. This mechanism cyclically racked the opposite corners of the structure in opposite directions through a total travel of 5–9 inches which is considerably more severe than the conditions expected during normal handling and transportation. After 70 cycles of such racking, there was no evidence of cracking in the joint.

EXAMPLE V

Two 2 ft.×4 ft. sheets of gypsum wall board were nailed onto a 4 ft.×4 ft. rectangular frame constructed from wood 2×4's. The adjoining long edges of the two sheets extending across the middle of the frame were unsupported. A joint cement prepared in the manner described in Example II was applied with a trowel to fill the joint and provide a smooth feathered surface without a tape material. The frame was placed on the floor and a 300 pound dead weight having a surface area of 400 square inches was centered on the joint. The joint was inspected at two different times afterwards and was found to be in tact after 9 hours but cracked some time between the inspection and one made 24.5 hours later.

From these test results, it can be seen that a joint cement prepared by mixing the wall board joint compound and the liquid additive composition of the invention is capable of providing a crack-resistant joint having superior strength characteristics without a tape material.

From the foregoing description, one skilled in the art can easily ascertain the essential characteristics of the invention and, without departing from the spirit and scoop thereof, can make various changes and modifications to adapt it to various usages and conditions.

I claim:

1. A liquid additive composition for admixing with a wall board joint compound to provide a joint cement, said liquid additive composition comprising an aqueous mixture containing about 0.35 to about 8 weight % zinc oxide, about 0.35 to about 1.5 weight % sodium acetate, about 0.35 to about 3 weight % ammonium alum, and about 0.35 to about 8 weight % of an acrylic resin, based on the total weight of the aqueous mixture.

2. A liquid additive composition according to clam **1** containing about 0.7 weight % zinc oxide, about 0.7 weight % sodium acetate, about 0.7 weight % ammonium alum, and about 0.7 weight % of the acrylic resin.

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